

PN ACD 078
98507

Intermediate Results Review

IR 2.3.2: Improved Industrial Pollution Management

Environmental Pollution Prevention Project

USAID/Office of Environment and Urban Programs

March 25, 1997

Overview of Presentation

- ◆ **Program Overview**

- ◆ **Results framework**

- **Cleaner Production Practices**
- **Policies that Encourage Cleaner Production**
- **Partnerships that Promote Cleaner Production**

- ◆ **Lessons Learned**

- ◆ **Detailed Results**

Objectives

- ◆ **Improving Production Practices**
- ◆ **Strengthening Government Policies and Institutions**
- ◆ **Building Partnerships to Ensure Sustainability**

Benefits of Pollution Prevention

- ◆ **Least cost approach to reducing pollution**
- ◆ **Cost-effective approach for increasing productivity, competitiveness, and product quality**
- ◆ **Effective method for demonstrating the benefits of process control and measurement**

Approach

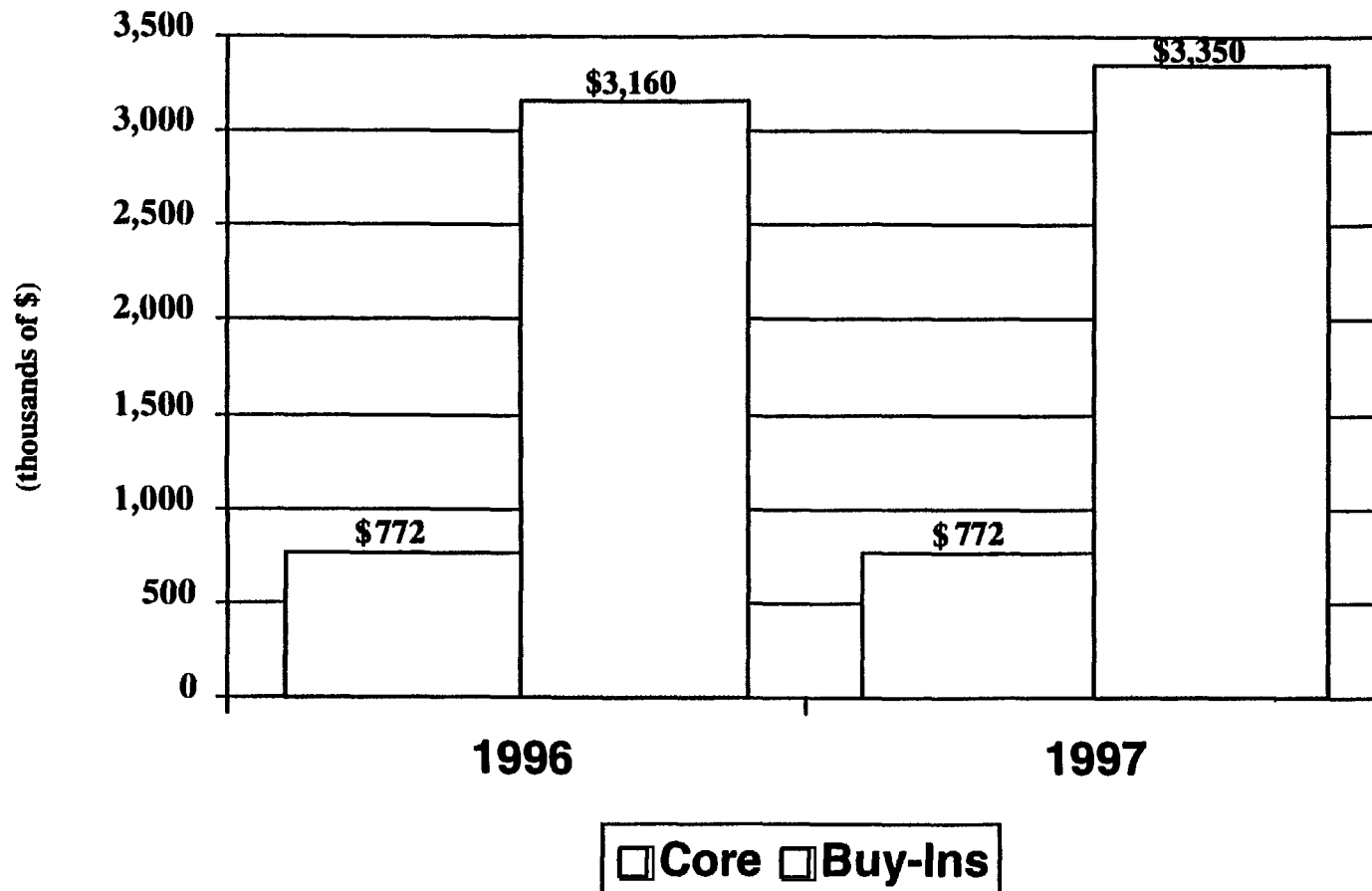
- ◆ **Work with USAID Missions that want to empower public and private enterprises**
- ◆ **Select local institutions willing to make a long-term commitment to cleaner production**
- ◆ **Hire the best local staff and train them to be leaders in cleaner production**
- ◆ **Employ an integrated approach to change behavior**
 - **Demonstrations**
 - **Training and outreach**
 - **Policy reform**

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Core Funds Leveraged



Environmental Pollution Prevention Project

Partners

- ◆ **Bolivia -- CAMARA, LIDEMA**
- ◆ **Chile -- AMCHAM, Qualitek, CIPMA**
- ◆ **Ecuador -- OIKOS**
- ◆ **Egypt -- FEI, DRTPC, Tabbin Institute of Metallurgical Studies**
- ◆ **Indonesia -- ICIP, BAPEDAL, Ministry of Industry & Trade**
- ◆ **Mexico -- NCPC, IPA**
- ◆ **Paraguay -- UIP**
- ◆ **Tunisia -- CP3, IRSIT, MEAT, UTICA**

IR 2 3 2 IMPROVED INDUSTRIAL POLLUTION MANAGEMENT *DETAILED SUMMARY OF RESULTS*

- ▶ Information and lessons learned shared with other EP3 country programs at EP3 Worldwide Meeting
- ▶ Five implementation case studies completed and disseminated

POLICY CHANGE

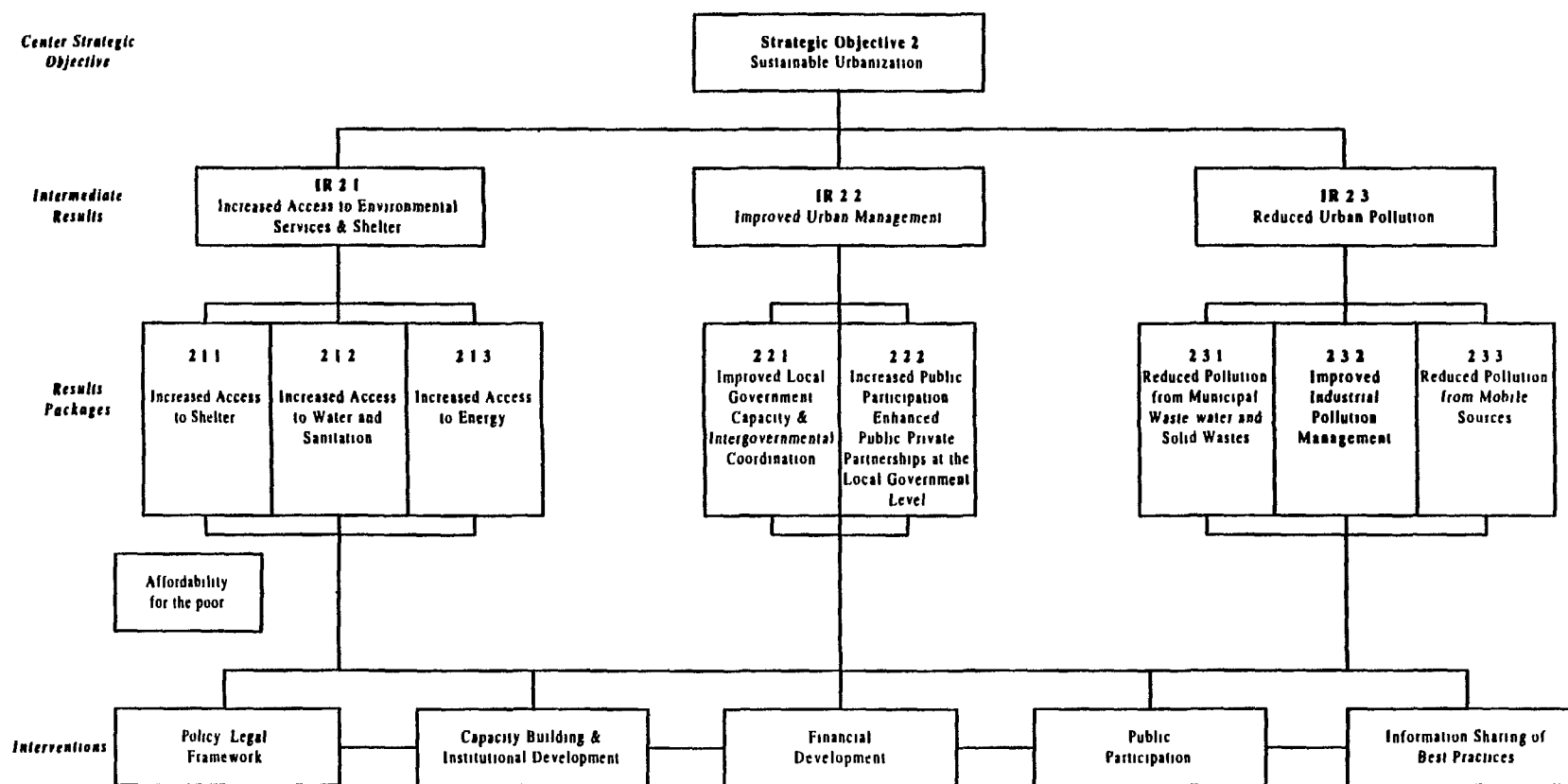
- ▶ Cleaner production policy reform initiated by Chilean Ministry of Industry (Mol)
- ▶ Award of Mol contract "Diseño de Una Estrategia Estatal de Fomento a la Produccion Limpia" - developing a cleaner production strategy for Chile, to EP3/Chile contractor

PARTNERSHIPS AND CAPACITY BUILDING

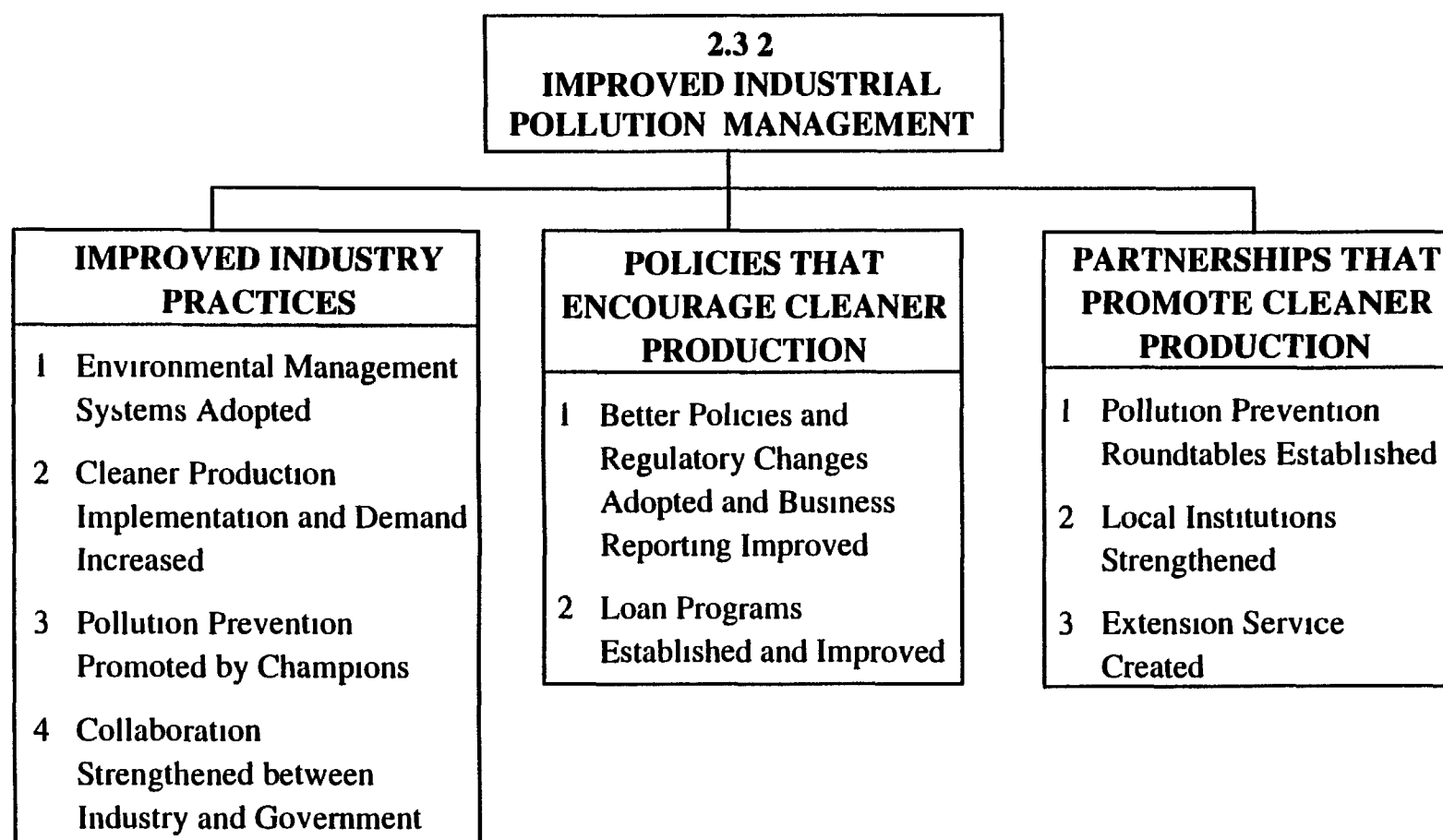
- ▶ EPA US IIES funds used to support training and information activities of Centro de Investigacion y Planificacion del Medio Ambiente (CIPMA)
- ▶ EP3/Chile staff member trained in ISO 9000 and ISO 14000 at US training facilities
- ▶ Technical expertise of 30 dairy industry representatives increased through two-day training on P2 applications and methods held in Valdivia
- ▶ Salmon producers and processors in Puerto Montt trained in identifying and implementing P2 opportunities
- ▶ Members of the chemical processing industry in Santiago trained in P2 applications and methods
- ▶ Five P2 training modules tailored for local use, (i.e., incorporation of local examples and translation into Spanish)
- ▶ Twenty-five CONAMA personnel from regional offices throughout Chile trained in pollution prevention and training techniques
- ▶ Over 100 industry leaders exposed to EP3/Chile results and educated in benefits of P2 approaches at Leadership Conference held in Santiago
- ▶ Over 30 consultants trained in P2 auditing techniques and report writing through long-term participation in PPDAs and follow-up activities

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SO2: Sustainable Urbanization Results Framework



IR 2.3.2: Results Framework





EP3's Approach with Industry

- ◆ **Sectors and plants carefully selected**
- ◆ **Plant specific audits laid an important foundation for subsequent activities**
 - **Local case studies**
 - **Understanding of the industry**
 - **Relationships with key players**
- ◆ **Multi-plant demonstration projects build on audit experience**



Industry Exposure to Cleaner Production

Total Number of Industry Representatives Participating in EP3 Activities

Country	PPDAs*	Employee Training Programs	Training/ Technical Assistance	P2 Awareness	TOTAL
Bolivia	33		45	20	98
Chile	81	300	163	517	1,061
Ecuador	42		45	63	150
Egypt	93		766	443	1,302
Indonesia	96		180	500	776
Mexico	9		18	105	132
Paraguay	18			30	48
Peru	24		30	30	84
Tunisia	39	250	28	291	608
Other	6		50	50	106
TOTAL	441	550	1,325	2,049	4,365

* Pollution Prevention Diagnostic Assessments



Production Sectors Assisted

Sector	Appliance/ Automobile Assembly	Battery	Ceramic	Chemical/ Pharmaceutical	Food Processing	Furniture	Hospital/ Hotel	Metal	Mining	Paint	Paper & Wood	Printing	Tannery	Textile
Bolivia					◆			◆					◆	◆
Chile				◆	◆		◆	◆	◆	◆		◆	◆	◆
Ecuador	◆		◆		◆			◆			◆		◆	◆
Egypt	◆		◆	◆	◆	◆	◆	◆			◆			◆
Indonesia		◆				◆		◆			◆	◆		
Jamaica							◆							
Mexico	◆													
Paraguay					◆								◆	
Peru					◆									
Sri Lanka					◆									
Tunisia		◆			◆		◆	◆				◆	◆	◆
Zambia				◆										◆



Improved Industry Practices

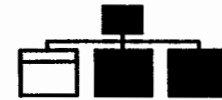
Selected 96 Results

- ◆ **ISO 14000 and EMS training in Egypt**
- ◆ **Egypt approach revised to feature EMS in all audits and TA activities**
- ◆ **Industry “Circles” established in Egypt, Ecuador, Mexico, Bolivia, and Indonesia**
- ◆ **Industrial environmental committees established to encourage and monitor industry**
- ◆ **Industrialists serve as spokespersons on P2 (Bishara Textiles-Egypt, Corimexo-Bolivia, Mitra Jennings-Indonesia)**

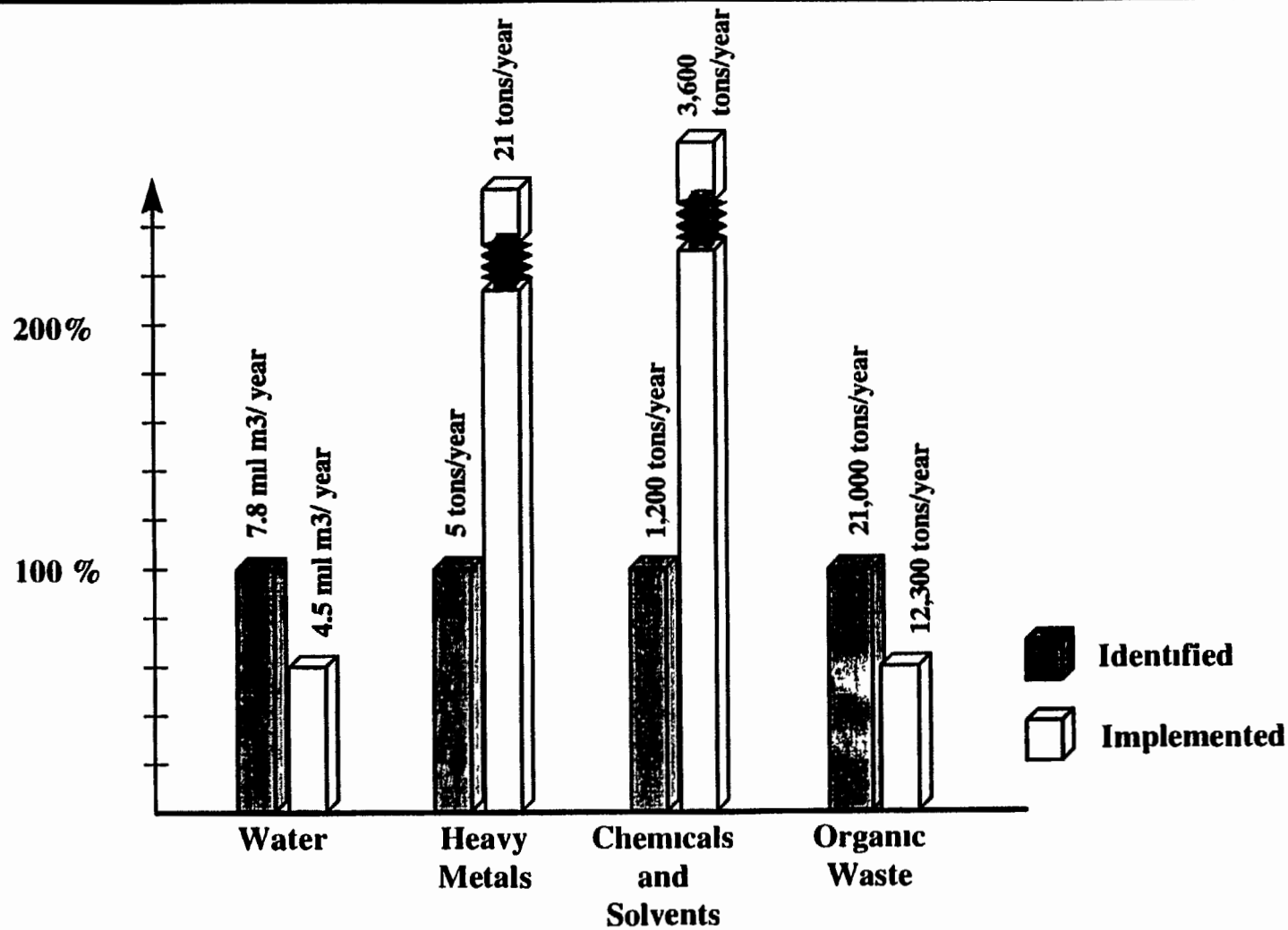


Implementation Results: Indonesia

- ◆ **\$2.3 million invested by 14 plants in three sectors (pulp and paper, electroplating, flexible packaging)**
- ◆ **\$7.5 million in savings realized annually by the 14 plants from CP implementation**
- ◆ **\$115 million potential nationwide annual savings if all plants in the three participating sectors were to implement at similar rates**
- ◆ **1,300 person weeks contributed by participating plants**

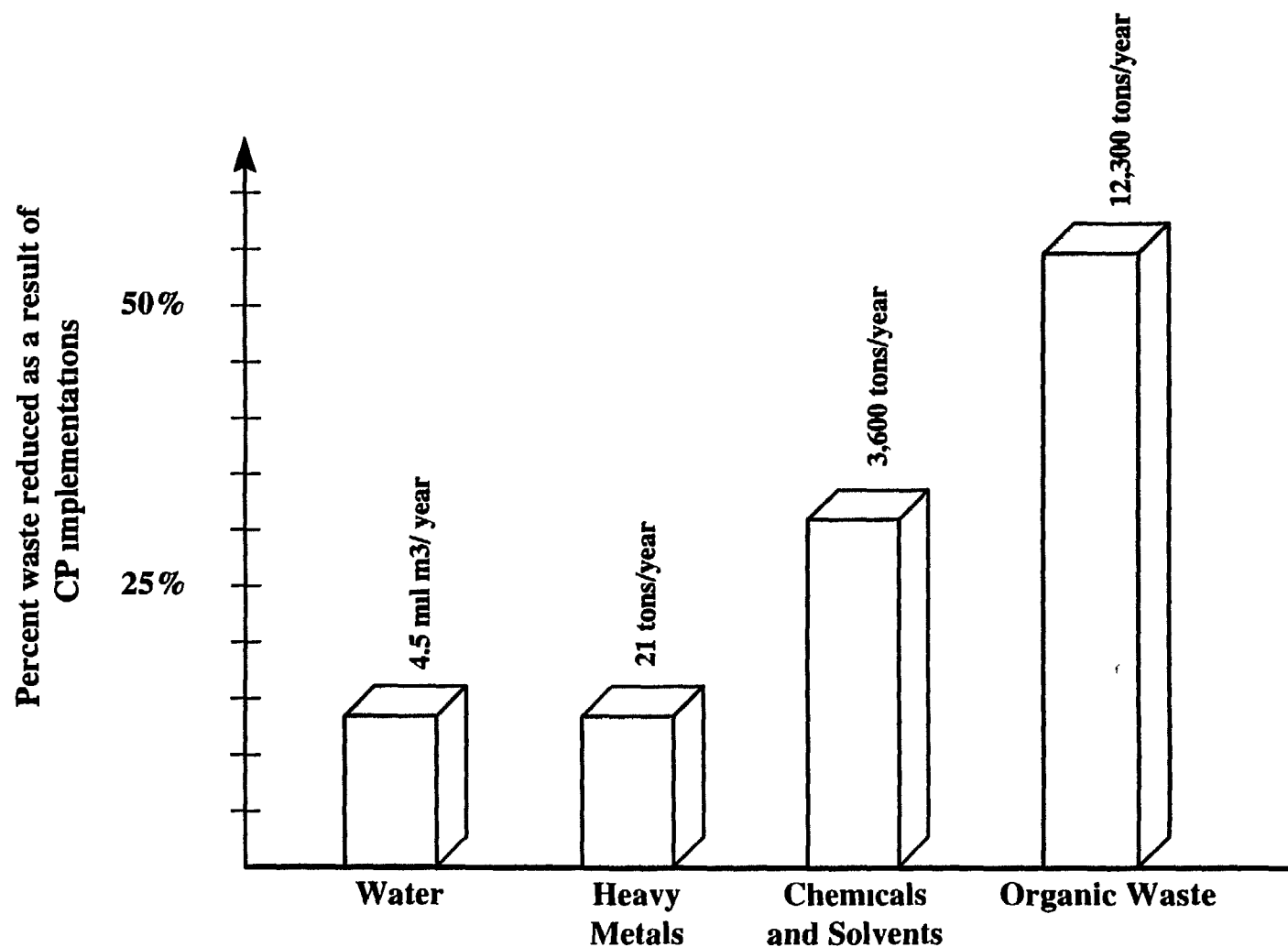


Implementation Results: Indonesia





Implementation Results: Indonesia



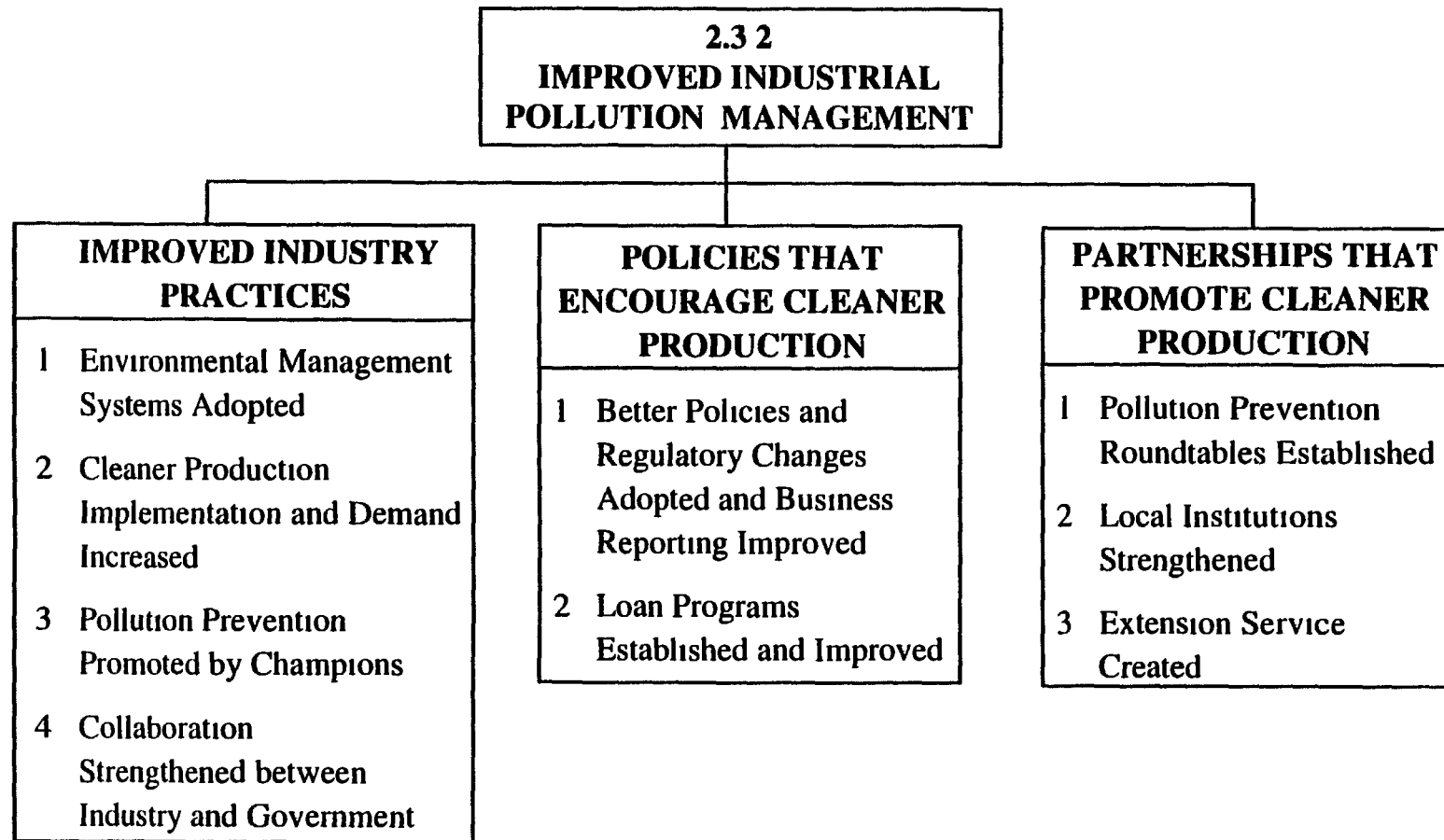


Implementation Results

Selected 96 Results (cont.)

- ◆ **Industry is investing in cleaner production equipment**
 - **Curtiembre Inpacuer (tannery, Paraguay) invested \$61,000 in CP and saved \$33,000 in the first 6 months**
 - **NOUR (battery manufacturer, Tunisia) invested \$340,000 in CP technology**
 - **Hitega (textile dyeing, Chile) avoided cost of installing and operating wastewater treatment by using P2**
- ◆ **Industries pay for audits, information, and training (Tunisia, Chile, Bolivia, Ecuador)**

Policies That Encourage Cleaner Production





Policies Encourage Cleaner Production

- ◆ **Legal/regulatory climate must encourage cleaner production and sustainable practices**
- ◆ **Foster industry and government collaboration to develop regulatory frameworks**
- ◆ **Promote financial incentives to encourage cleaner production**
- ◆ **Focus on new plants and expansions as well as existing plants**

Govt. Officials Participating in Awareness & Training Events



Country	Total Number of Government Participants
Bolivia	36
Chile	309
Ecuador	50
Egypt	125
Indonesia	117
Mexico	40
Paraguay	15
Peru	37
Tunisia	114
Other	40
TOTAL	883

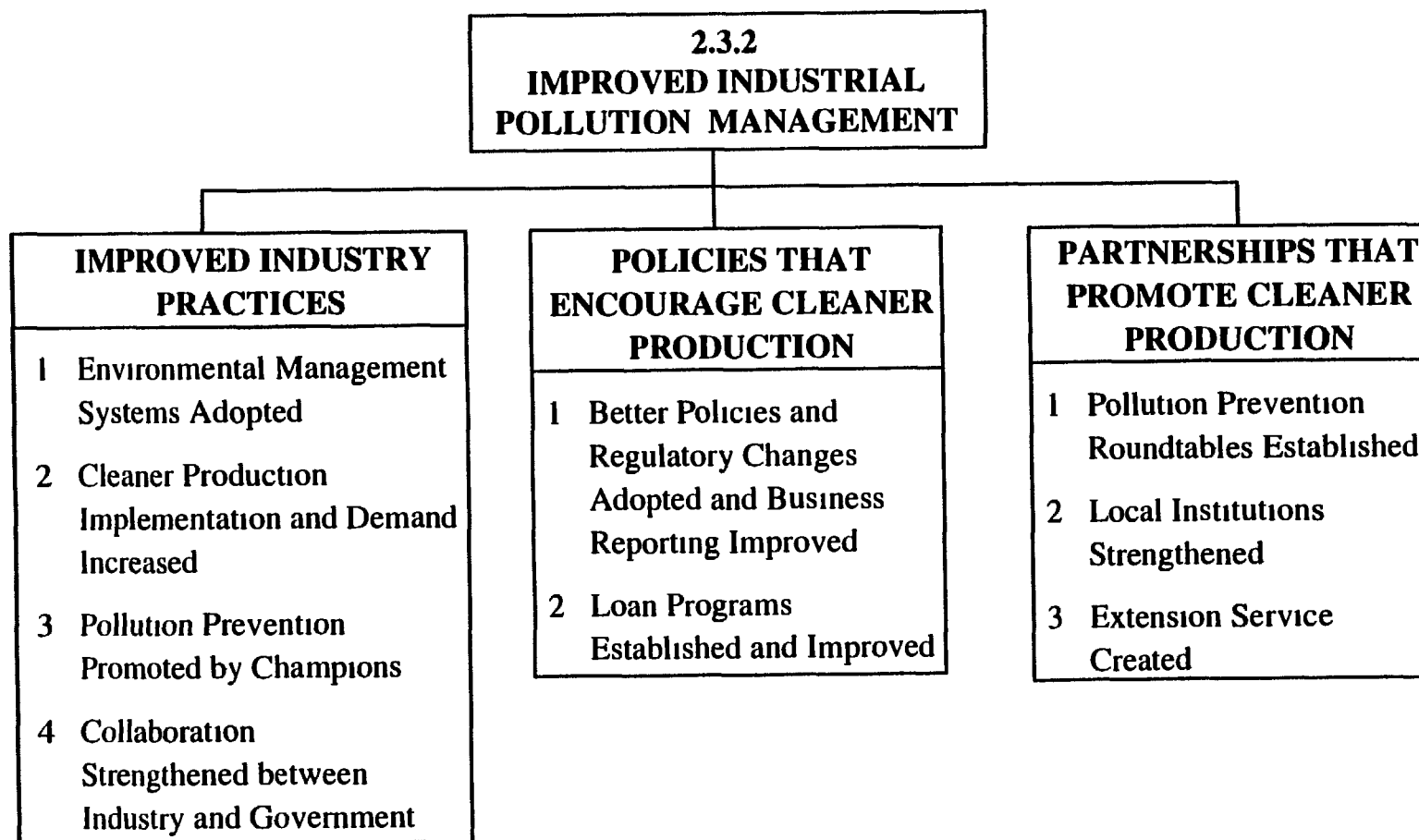


Policies Encourage Cleaner Production

Selected 96 Results

- ◆ **Appointment of Pollution Prevention coordinator in the Ministry of Environment in Tunisia**
- ◆ **Peru framework legislation for environmental management**
- ◆ **EIA planning initiative for new investments in Indonesia**
- ◆ **Joint industry/government project in 10th of Ramadan, Egypt**
- ◆ **Loan programs created or revised to recognize clean technology (Tunisia, Sri Lanka, Egypt, Jamaica)**

Partnerships Promote Cleaner Production





Partnerships Promote Cleaner Production

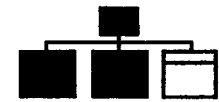
◆ EP3 commitment to partnerships

- Essential to success of the program
- Necessary for sustainability
- Enhances information flow and limits duplication of effort
- Effectively uses resources



Partnerships Promote Cleaner Production

- ◆ In addition to our local partners, EP3 collaborates with:
 - Water Environment Federation (all EP3 countries)
 - UNEP/UNIDO (Tunisia, Mexico, Sri Lanka, Indonesia)
 - World Bank (Egypt, Indonesia)
 - EPA (Ecuador, Tunisia, Egypt, Indonesia, Mexico)
 - Environmental Export Council (Mexico)
 - State P2 programs (Mexico, Egypt, Indonesia)
 - Bank of America (Indonesia)



Partnerships Promote Cleaner Production

◆ EP3 also works closely with other USAID programs:

- **USAEP (Indonesia)**
- **EHP (Jamaica, Peru)**
- **ELP (LAC Region)**
- **HFTE (LAC Region)**
- **EEP (Mexico)**
- **ECEP (Egypt)**
- **Sustainable Tourism (Egypt, Jamaica)**



Partnerships Promote Cleaner Production

Selected 96 Results

- ◆ **EP3 Worldwide Meeting in June 1996**
- ◆ **Indonesian Pollution Prevention Roundtable**
- ◆ **Mexico NCPC launched with EP3 support**



Partnerships Promote Cleaner Production

Selected 96 Results (cont.)

- ◆ **Local NGOs (OIKOS, CIPMA, LIDEMA) strengthened**
- ◆ **Pollution prevention incorporated into university curricula (Bolivia, Ecuador, Tunisia)**
- ◆ **Over 200 local consultants used in pollution prevention activities and several hundred others trained**
- ◆ **Centre de Production Plus Propre (CP3) (Tunisia) and [Qualitek/ERM] (Chile) sell pollution prevention services to donors, government, and industry**

Indicators of Project Sustainability

Country	Number of sectors reached	Number of showcase facilities created	Number of sustainable CP successor groups formed	Shift in national or regional level policy towards CP
Bolivia	4	8	4	
Chile	9	16	4	→
Ecuador	7	10	5	→
Egypt	9	9	6	→
Indonesia	5	30	10	→
Mexico	2	6	4	→
Paraguay	2	4	3	→
Peru	1	7	3	✓
Tunisia	7	13	8	✓
Total	46	103	47	6

Major 1997 Initiatives

- ◆ **Establish Roundtables (LAC, Egypt)**
- ◆ **Replace “Pollution Prevention” with “EMS” in all countries**
 - **Municipal EMS pilot project**
 - **Industry EMS demonstrations in selected countries**
- ◆ **Evaluate and expand “Circle” concept**
- ◆ **Target new construction (industrial estates)**
- ◆ **Develop sustainability plans (Egypt, Bolivia, Paraguay, Ecuador, Indonesia)**
- ◆ **Industry/government policy dialogues to promote CP**

Lessons Learned

- ◆ **Integrated approach is essential**
- ◆ **Focus on new industrial infrastructure**
- ◆ **Importance of champions**
- ◆ **Role of local governments**
- ◆ **Adjust approach to take advantage of market trends**
- ◆ **Achieving sustainability takes time and patience**

ENVIRONMENTAL POLLUTION PREVENTION PROJECT

The Environmental Pollution Prevention Project (EP3) provides technical assistance and policy support to the public and private sectors in countries where the U S Agency for International Development (USAID) is active. The project's activities focus in three areas:

Improving Industry Practices In partnership with developing country institutions, the project provides technical assistance, training, and information services to improve environmental management practices in both private and public sector companies. The project uses demonstration projects to build awareness and create demand for clean technology and environmental services and provides training and institutional support to build local capacity to deliver these services.

Strengthening Government Policies and Institutions The project assists municipal and national governments to develop and implement policies and regulations that promote cleaner production and remove biases that favor end-of-pipe treatment over pollution prevention options.

Building Partnerships to Ensure Sustainability The project develops partnerships with key institutions to ensure the continuous distribution and access to cleaner production information, services, technologies and tools.

DETAILED RESULTS SUMMARIES

I BOLIVIA

II CHILE

III EGYPT

IV ECUADOR

V INDONESIA

VI MEXICO

VII PARAGUAY

VIII PERU

IX TUNISIA

X CORE

IR 2 3 2 IMPROVED INDUSTRIAL POLLUTION MANAGEMENT *DETAILED SUMMARY OF RESULTS*

I. BOLIVIA

INDUSTRY BEHAVIOR AND OUTREACH

- ▶ Eight hundred dollars collected for each EP3 assessment by CNI
- ▶ As a result of EP3 assistance, Frigorifico Oriente, a beef slaughterhouse, was able to reduce its BOD loadings by 60% by purchasing blood processing equipment that eliminated the discharge of fresh blood to its oxidation pond. By converting the waste blood to a sellable product, the facility reduced annual BOD waste by 140 tons and generated a net income of US \$29,000 per year.
- ▶ Sixteen facilities selected in the tannery, textile, and paint manufacturing industries to serve as demonstration projects. Additional facilities in the glass bottling plants, foundry, galvanizing, and poultry processing sectors selected in Cochabamba.
- ▶ As a result of EP3 implementation assistance to three tanneries, 19 CP/P2 measures recommended, 8 implemented, and equipment purchased to complete implementation (of 19 measures) and/or to implement additional measures.
- ▶ As a result of EP3 implementation assistance to three textile plants, 37 P2 opportunities identified, 8 CP/P2 measures implemented. Savings due to one measure implemented at one plant estimated at \$25,000/year. Capacity increased at two plants, so implementation of remaining measures can begin soon. (Third plant is run-down and reducing personnel and production, so no measures implemented.)
- ▶ As a result of EP3 implementation assistance to one poultry processing facility, 2 CP/P2 measures implemented.
- ▶ Regular column published in CNI's magazine, *Industria*. As the national association representing industry, CNI's agreement to publish articles on P2 represents a major publicity opportunity for EP3/Bolivia.
- ▶ EP3/Bolivia information center established at LIDEMA.
- ▶ Information and lessons learned and shared with other EP3 country programs at EP3 Worldwide Meeting.

IR 2 3 2 IMPROVED INDUSTRIAL POLLUTION MANAGEMENT *DETAILED SUMMARY OF RESULTS*

- Pollution prevention awareness heightened and opportunities highlighted at three pollution prevention marketing seminars and ten presentations to local industry groups (tannery, textile, and paint manufacturing), NGOs, government officials and local press in the cities of La Paz, Cochabamba, and Santa Cruz

POLICY CHANGE

- ▶ Inter-institutional committee formed to support EP3 in Bolivia through planning and follow-up activities, and to address pollution prevention issues Committee provides forum for planning activities with the Government Members include EP3/Bolivia, the Bolivian Sub-Secretary of the Environment, the Secretary of Industries, CNI, local USAID program staff, and industry representatives

PARTNERSHIPS AND CAPACITY BUILDING

- Partnership with Cámara Nacional de Industrias (CNI) established to disseminate information to industry and encourage implementation of CP opportunities among its members
- ▶ EP3 promoted by CNI leadership as integral and valuable part of the association
- ▶ Partnership with the Liga de Defensa al Medio Ambiente (LIDEMA) established to create clearinghouse
- Partnerships with the Under Secretary of Energy and the World Bank established to conduct work in energy efficiency
- ▶ Partnership with the University of Bolivia School of Industrial Engineering established to teach university students to identify and implement P2/CP opportunities
- ▶ Collaboration established with the Fundacion para el Desarrollo Sostenible (FUNDES) to avoid duplication of efforts and to cooperate in certain sectors (e g , tanneries)
- ▶ Partnership with the Instituto para el Desarrollo de Empresarios y Administradores (IDEA) established for conducting seminars and workshops

IR 232 IMPROVED INDUSTRIAL POLLUTION MANAGEMENT *DETAILED SUMMARY OF RESULTS*

- ▶ EP3/Bolivia staff trained at US pollution prevention training facility (WRITAR) on how to identify and evaluate P2 opportunities
- ▶ EP3/Bolivia staff technical skills improved through on-the-job training with US consultants during in-country pollution prevention demonstration projects
- ▶ Two local consultants trained on how to identify and analyze pollution prevention opportunities in preparation for a PPDA
- ▶ Thirty-six tanners introduced to pollution prevention concepts and applications at workshop held in Cochabamba
- ▶ Additional plants selected in Cochabamba and Santa Cruz to improve technical skills of plant staff in identifying and evaluating P2 opportunities
- ▶ EP3/Bolivia staff able to give technical advice to university students on research projects and theses based on knowledge and experience gained from participating in EP3
- ▶ Twenty-eight industry representatives and government decision-makers introduced to pollution prevention concepts at one-day workshop delivered by EP3/Washington, EP3/Bolivia, and WEF staff
- ▶ Hierarchy developed for determining best candidates for future assessments to maximize potential for achieving results with least number of demonstration facilities

IR 2 3 2 IMPROVED INDUSTRIAL POLLUTION MANAGEMENT *DETAILED SUMMARY OF RESULTS*

II CHILE

INDUSTRY BEHAVIOR AND OUTREACH

- ▶ Assessments and follow-up support provided to 25 facilities in eight sectors (textiles, leather tanning, mining, printing, paint processing, metal finishing, foundry operations, and meat slaughtering and processing facilities) Key achievements from selected assessments are as follows

Industry	Capital Costs*	Financial Benefits**	Selected Environmental Benefits
Textiles	\$5,000	\$23,000	reduce water use by 25%
Textiles	\$13,000	\$36,000	reduce fuel consumption by 7%
Tanning	\$34,000	\$55,000	reduce chromium in wastewater
Printing	\$1,400	\$4,700	reduce solvents in wastewater
Painting	\$61,000	\$76,000	eliminate mercury and heavy metals
Painting	\$14,000	\$46,000	reduce soil and water contamination

* One-time capital costs to be paid by the Chilean firm, ** Financial benefits per year resulting from capital expenditure

- ▶ P2 information center established in CIPMA
- ▶ Press conference held to publicize results of EP3/Chile demonstration projects
- ▶ Four breakfast meetings held with specific industrial sectors (tannery, textile, metal finishing, and chemical and pharmaceutical) to market EP3/Chile's pollution prevention services

IR 2 3 2 IMPROVED INDUSTRIAL POLLUTION MANAGEMENT *DETAILED SUMMARY OF RESULTS*

- ▶ Information and lessons learned shared with other EP3 country programs at EP3 Worldwide Meeting
- ▶ Five implementation case studies completed and disseminated

POLICY CHANGE

- ▶ Cleaner production policy reform initiated by Chilean Ministry of Industry (Mol)
- ▶ Award of Mol contract "Diseño de Una Estrategia Estatal de Fomento a la Produccion Limpia" - developing a cleaner production strategy for Chile, to EP3/Chile contractor

PARTNERSHIPS AND CAPACITY BUILDING

- ▶ EPA US IIES funds used to support training and information activities of Centro de Investigacion y Planificacion del Medio Ambiente (CIPMA)
- ▶ EP3/Chile staff member trained in ISO 9000 and ISO 14000 at US training facilities
- ▶ Technical expertise of 30 dairy industry representatives increased through two-day training on P2 applications and methods held in Valdivia
- ▶ Salmon producers and processors in Puerto Montt trained in identifying and implementing P2 opportunities
- ▶ Members of the chemical processing industry in Santiago trained in P2 applications and methods
- ▶ Five P2 training modules tailored for local use, (i.e., incorporation of local examples and translation into Spanish)
- ▶ Twenty-five CONAMA personnel from regional offices throughout Chile trained in pollution prevention and training techniques
- ▶ Over 100 industry leaders exposed to EP3/Chile results and educated in benefits of P2 approaches at Leadership Conference held in Santiago
- ▶ Over 30 consultants trained in P2 auditing techniques and report writing through long-term participation in PPDA's and follow-up activities

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IR 2 3 2 IMPROVED INDUSTRIAL POLLUTION MANAGEMENT *DETAILED SUMMARY OF RESULTS*

- ▶ Two hundred participants representing industry, government agencies and the GOSDs in Alexandria and Cairo trained in the basics of pretreatment and the benefits of incorporating P2 approaches in industrial pretreatment programs. A total of five courses were given in Alexandria, Cairo, and the 10th of Ramadan over a three-week period.
- ▶ Thirty participants attended Solid Waste Management Course in the 10th of Ramadan to expand environmental management skills.
- ▶ Engineers at DRTPC and TIMS trained in pollution prevention auditing techniques.
- ▶ Courses on the relevance and implications of ISO 14001 environmental management standards attended by 434 industry leaders, consultants, and government officials. The course was delivered a total of eight times in four cities.

IV ECUADOR

INDUSTRY BEHAVIOR AND OUTREACH

- ▶ Plant personnel at 22 textile companies trained to identify and implement P2, CP and E2 opportunities This activity took place over a period of five months and included a series of three workshops, monthly rounds of plant visits by P2 and textile experts, and continuous support from local consultants
- ▶ Drinking water treatment technologies installed in Manta and Montescuro and drinking water treatment system operators trained to operate technologies
- ▶ EP3/Paraguay staff trained by EP3/Ecuador staff in pre-assessment methods at a Coca Cola plant in Asuncion
- ▶ Quarterly newsletter, case studies and other information on CP opportunities published by OIKOS and distributed to 550 entities on OIKOS mailing list
- ▶ Understanding increased between textile association and Quito's Municipality through OIKOS' facilitation of discussions between these entities
- ▶ Journalist hired by OIKOS to prepare information resources and serve as liaison with the media
- ▶ EP3/Ecuador information center established at OIKOS Ability to fulfill information center requests enhanced through cataloguing of EP3 clearinghouse into OIKOS information center

POLICY CHANGE

- OIKOS serving as unofficial advisor to seven municipalities in Ecuador and to the Presidential Environmental Commission (CAAM) on pollution prevention issues and policies The biggest changes have occurred in Cuenca, where the importance of environmental issues is widely recognized OIKOS is disseminating lessons learned in Cuenca to other parts of the country

IR 2 3 2 IMPROVED INDUSTRIAL POLLUTION MANAGEMENT *DETAILED SUMMARY OF RESULTS*

- ▶ Verbal support expressed by Director of Environment for Quito for EP3's activities as the proper first step for achieving compliance with environmental requirements

PARTNERSHIPS AND CAPACITY BUILDING

- ▶ Partnership with the Chamber of Industry established to disseminate information to industry and encourage implementation of CP opportunities among Chamber members Chambers of Industry of Pichincha, Cuenca, and Tungurahua involved
- ▶ Partnership with the Ecuadorian-American Chamber of Commerce established to market P2 opportunities
- ▶ Technical assistance provided to the IDB for one project in Quito and one in Guayaquil
- ▶ Three local consultants hired as pollution prevention professionals to offer pollution prevention services to Ecuadoran industries
- ▶ Two junior engineers at OIKOS exposed to P2 principles to enable them to consult in future
- ▶ OIKOS personnel able to train others in concepts of CP/E2 by attending train-the-trainer course in Chile
- ▶ Technical expertise of two EP3/Ecuador staff expanded by participating in pollution prevention information systems training
- ▶ Agreement for Sustainable Cities signed by RHUDO/SA and Mayor of Cuenca to launch program to promote sustainable development
- ▶ Sustainable Cities Citizens' Committee established by Mayor of Cuenca to promote public participation in developing an environmental agenda for the city Committee consists of 14 people from industry, NGOs, women's groups, neighborhood associations, local universities, media, and religious groups
- ▶ Technical expertise of two EP3/Ecuador staff increased through participation in co-generation and energy efficiency course in Las Vegas

IR 2 3 2 IMPROVED INDUSTRIAL POLLUTION MANAGEMENT *DETAILED SUMMARY OF RESULTS*

VI MEXICO

INDUSTRY BEHAVIOR AND OUTREACH

- ▶ Commitment by plant managers in Reynosa and Matamoros to implement CP opportunities
- ▶ As a result of EP3 technical assistance through the Mexican Border Project, CP/E2 programs implemented at ten maquilas and one hotel
- ▶ Commitment by six electroplating plants in Mexico City to implement CP/E2 measures based on outcome of CP/E2 assessments in facilities
- ▶ Lessons learned from, and information exchanged with, Mexican NCPC representative and UNIDO's Mexican representative at EP3 Worldwide Meeting in Washington in June
- ▶ One-day conference held in Reynosa entitled *Benefitting from Pollution Prevention and Energy Efficiency Experiences of the Maquiladora Industry in Reynosa and Matamoros* Conference was co-sponsored by the Texas Natural Resource Conservation Commission (TNRCC) and the Environmental Defense Fund (EDF) The Department of Ecology of the Municipality of Reynosa also played a major role in the conference The conference enabled plants in the region that participated in the pollution prevention programs of EP3, TNRCC, and EDF to share their experiences with other facilities A total of 81 representatives from 59 maquiladoras, along with three major industry associations attended the conference

PARTNERSHIPS AND CAPACITY BUILDING

- ▶ Information on cleaner production (CP) and energy efficiency (E2) disseminated and implementation of CP and E2 measures encouraged through partnerships with the Maquila Associations of Reynosa and Matamoros
- ▶ Linkages established with UNIDO through support of Mexican NCPC
- ▶ Information on CP disseminated and implementation of CP measures encouraged in Mexico City through an alliance with CANACINTRA (Chamber of Industries), partnership established with CANACINTRA through the Mexican NCPC
- ▶ Facility personnel from ten plants and one hotel trained in CP/E2 applications and methods in Mexican Border Project, facility staff in turn worked with other plant staff to identify and implement CP and E2 measures (materials were translated into Spanish for this training)
- ▶ Approximately 30 consultants trained in CP techniques in the electroplating industry at joint EP3/NCPC course

VII PARAGUAY

INDUSTRY BEHAVIOR AND OUTREACH

- ▶ Savings at one slaughterhouse estimated at \$740,000 per year for a capital investment costs of \$225,000, solids releases reduced by 625,000 pounds/year, BOD discharges reduced by 258,000 pounds/year, and water consumption reduced by 115,500 m³/year
- ▶ Savings at one tannery estimated at \$142,000 per year in operating costs and \$33,000 in capital costs for an initial investment of \$61,000, chemical compounds reduced by 531,000 pounds/year, BOD discharges reduced by 151,000 pounds/year, and water consumption reduced by 27,400 m³/year
- ▶ At least 15 articles and other program information published in national newspapers
- ▶ Information center established at the UIP
- ▶ Contacts established and perspectives gained on other EP3 country programs at EP3 Worldwide Meeting
- ▶ Close working relationships established with members of the media to promote awareness of the concept of P2 and of P2 opportunities
- ▶ Two articles published in technical journals to disseminate information regarding P2 applications and methods
- ▶ One slaughterhouse selected to demonstrate pollution prevention opportunities to other facilities
- ▶ One tannery selected to demonstrate pollution prevention opportunities to other facilities

POLICY CHANGE

- ▶ Efforts underway to encourage SENASA to incorporate pollution prevention and cleaner production into the country's future environmental policies

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PARTNERSHIPS AND CAPACITY BUILDING

- ▶ MOU signed with the Paraguayan Board of Industries (UIP) outlining responsibilities of UIP and EP3 regarding P2 program
- ▶ Fifty industry representatives and government decision-makers introduced to pollution prevention concepts at one-day workshop delivered by EP3/Washington, EP3/Paraguay, and WEF
- ▶ Solid understanding of principles of pollution prevention gained by 55 representatives from 42 companies through attendance at seminars, workshops and presentations
- ▶ EP3/Paraguay staff trained in US at WRITAR on how to identify and evaluate pollution prevention opportunities
- ▶ Technical expertise of EP3/Paraguay staff advanced by interaction with US consultants during in-country pollution prevention demonstration projects
- ▶ Technical expertise of EP3/Paraguay staff advanced by attending conferences and visiting facilities in the US to compare working conditions with those in Paraguay and to increase knowledge regarding potential pollution prevention opportunities
- ▶ Local consultant and EP3/Paraguay staff trained by EP3 Ecuador staff on how to conduct preassessments
- ▶ One tannery selected to serve as a demonstration project to highlight P2 opportunities
- ▶ Eight tannery representatives trained in how to identify and implement pollution prevention opportunities
- ▶ Understanding of pollution prevention concepts expanded through EP3 assistance for representatives from five slaughterhouses that are potential candidates for future assessments

VIII PERU

INDUSTRY BEHAVIOR AND OUTREACH

- ▶ Two companies in the fishmeal sector selected to install new technologies as demonstration projects
- ▶ As a result of cleaner production technical assistance to the fishmeal industry in Paracas
 - Agreement by fishmeal plants in Paracas to strive to reduce pumpwater volumes by 50% by the end of the year
 - New understanding on how to design a sampling program to measure raw material losses accurately
 - Recognition on part of plants of importance of preserving fish quality to reduce raw material losses and maintain high quality fishmeal

POLICY CHANGE

- ▶ Policy and regulatory assistance provided by the Environmental Law Institute to assist the Ministry of Industry (MITINCI) in developing a framework regulation covering industrial pollution that stresses preventive approaches to waste management. The regulation will be the first of its kind to be implemented in Latin America

PARTNERSHIPS AND CAPACITY BUILDING

- ▶ Consortium of representatives from USAID, NGOs and the fishmeal industry formed to assist selected fishmeal processors interested in serving as pilot projects for cleaner technologies

IX TUNISIA

INDUSTRY BEHAVIOR AND OUTREACH

- ▶ As a result of EP3 implementation assistance, including assessments conducted at 13 facilities in eight industrial sectors, i e , electroplating, printing, leather tanning, edible oil/soap processing, battery manufacturing, textiles, sugar, and hotels, implementation of recommended pollution prevention measures resulted in an estimated savings of \$4 5 million and conservation of
 - 232,000 m³ of water,
 - 620,000 kwh of electricity,
 - 500,000 m³ of gas, and
 - 485,000 liters of fuel oil
- ▶ CP articles written regularly for Tunisian newspapers and industrial magazines
- ▶ Articles on the EP3/Tunisia experience published in international pollution prevention and cleaner production magazines
- ▶ Information center established, with over 900 pollution prevention publications and electronic linkages with EP3/Washington and other sources of clean technology information, including USEPA and UNEP
- ▶ Outreach seminars and training workshops promoting P2/CP held for over 600 participants, including over 250 from industry, 100 from government, and 200 consultants and engineering students
- ▶ Information and lessons shared with other EP3 country programs at EP3 Worldwide Meeting

POLICY CHANGE

- ▶ Pollution prevention strategy objectives formulated by the U S EPA and the local EP3/Tunisia team, and approved at the ministerial level, with support from ANPE and ONAS
- ▶ Pollution prevention coordinator appointed within MEAT
- ▶ Mechanisms established that allow companies to apply for financing for pollution prevention activities under MEAT's Depollution Fund
- ▶ Marketing approach adopted by CP3 emphasizes pollution prevention as key mechanism to achieve environmental compliance

PARTNERSHIPS AND CAPACITY BUILDING

- ▶ Centre de Production Plus Propre (CP3) selected by UNIDO to serve as the Tunisian NCPC
- ▶ Close working relationships with industry federations and chambers of commerce, government, consultants, and NGOs maintained to sustain environmental management and P2 activities
- ▶ Technical expertise of EP3/Tunisia staff expanded through participation in over 22 conferences attended by more than 1,500 participants from European countries, and international agencies and NGOs, e g , Second European P2 Round table
- ▶ Technical workshop provided for 12 employees of MEAT and the Agence Nationale de Protection de l'Environnement (ANPE) to expand knowledge of P2 applications and methods
- ▶ Eight technical workshops for 204 participants, including 28 industry managers, 40 government officials, 30 consulting engineers and 91 students, provided to expand knowledge of concept of P2 and of P2 applications and methods
- ▶ Twenty-two representatives from consulting, government, and academia trained in interactive training techniques and P2 concepts All participants paid to attend



IR 2 3 2 IMPROVED INDUSTRIAL POLLUTION MANAGEMENT *DETAILED SUMMARY OF RESULTS*

X. CORE

INDUSTRY BEHAVIOR AND OUTREACH

- ▶ Identified, screened, and fielded over 150 paid and pro bono pollution prevention specialists, process experts, trainers, information specialists, financial planners, and policy analysts on EP3 training and technical assistance TDYs. A total of 43 pro bonos were provided: four in Bolivia, nine in Chile, 12 in Ecuador, six in Indonesia, one in Paraguay, nine in Egypt, one in Sri Lanka, and one in Peru. (Estimated total savings of \$200,000, assuming average trip is 12 days)
- ▶ Conducted QA/QC for assessments and other work performed in the field
- ▶ Developed and disseminated case studies and other information materials to EP3 country offices
- ▶ Assisted IDEMA and CIPMA in establishing CP clearinghouses
- ▶ Received and responded to over 300 requests for technical information in FY96

POLICY CHANGE

- ▶ Participated in an evaluation of policy and programmatic options for enhancing the effectiveness of EP3's project in Indonesia. A number of new initiatives, including the incorporation of P2 into the EIA process for new plants and ICIP's work with industrial estates, were undertaken as a result of this assessment.
- ▶ Cooperated with Environmental Law Program to develop a process for conducting policy dialogues in LAC
- ▶ Prepared an analysis of cleaner production and trade issues in LAC under HFTE

PARTNERSHIPS AND CAPACITY BUILDING

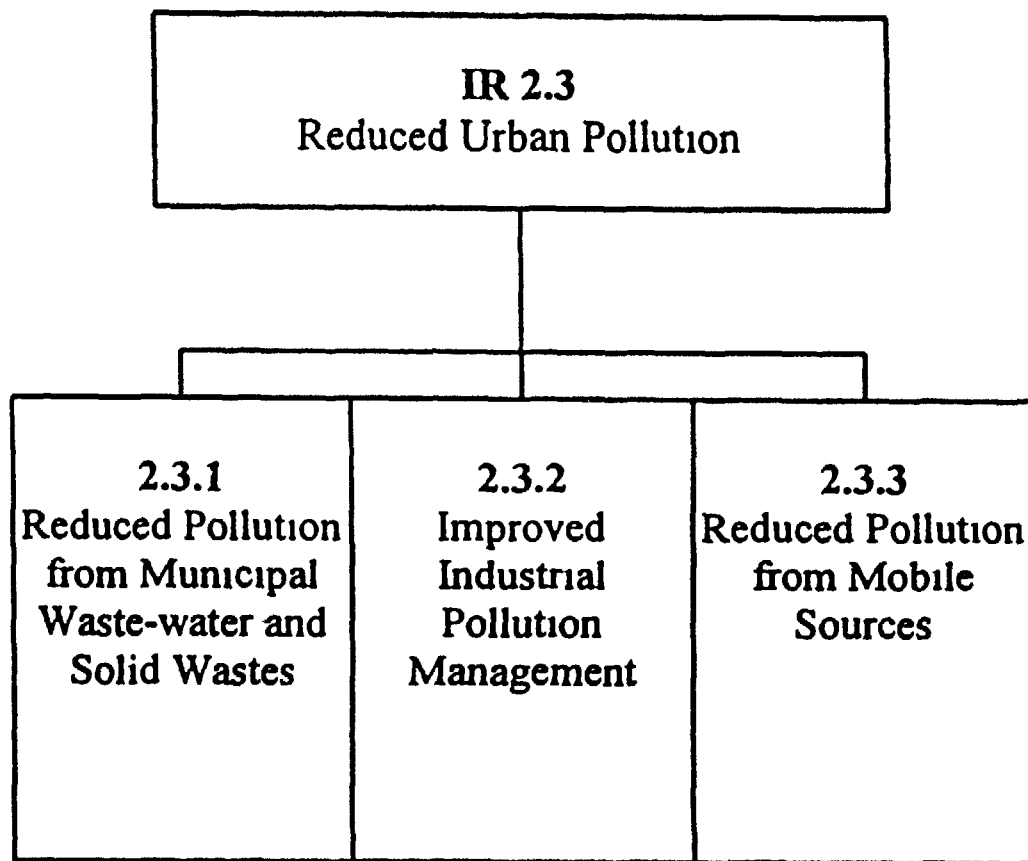
- ▶ In June, EP3/Washington hosted a one-week meeting for all EP3 programs (the EP3 Worldwide Meeting) to share and evaluate lessons learned in the first few years of the project and to set an agenda for the remainder of the project that would focus on expanding the scope of in-country activities to reach additional plants and achieve a greater impact
- ▶ Provided two senior pollution prevention experts from the US (Harry Freeman of USEPA and Dave Thomas from the Illinois Hazardous Waste Research and Information Center (HWRIC)) to evaluate the EP3/Egypt program and recommend options for increasing the program's effectiveness
- ▶ Hosted missions of government officials from Egypt, Indonesia, and Paraguay
- ▶ Assisted EP3/Tunisia and EP3/Chile in developing marketing and sustainability plans for the post-EP3 period Assisted EP3/Tunisia in preparing proposals to UNIDO and other donors for follow-on assistance
- ▶ Funded 50 percent of the ICIP Coordinator position
- ▶ In conjunction with WEF, EP3/Washington developed training plans for various EP3 countries and then developed materials for these courses, including detailed agendas for training courses and course materials
- ▶ Participated in training courses and workshops in Paraguay, Mexico, Bolivia, Egypt, Indonesia, and Chile
- ▶ Established new programs in Bolivia, Paraguay, Mexico, and Peru
- ▶ Designed and supported sustainable cities project in Cuenca, Ecuador

IR 2 3 2 IMPROVED INDUSTRIAL POLLUTION MANAGEMENT DETAILED SUMMARY OF RESULTS

- Training courses developed and delivered in 1996 include

Course Name	Training Developed	Spanish Translation	Training Delivered
Pollution Prevention for Chemical and Petroleum Processing Industries	X	X	Chile
Pollution Prevention/Energy Efficiency Training	X	X	Mexico, Ecuador
Pollution Prevention for Canning Industries	X		Chile
Pollution Prevention for Fish and Shellfish Processing Industries	X	X	Chile
Pollution Prevention for Food Processing Industries	X		Sri Lanka
Pollution Prevention for Dairy Industries	X	X	Chile
Pollution Prevention for Metal Finishing Industries	X (revised)		Egypt
Introduction to ISO 14000	X	In 1997	Egypt

SO2: Sustainable Urbanization Results Framework



Global Bureau Indicator:

Percentage of USAID-assisted countries making satisfactory progress towards reducing urban pollution

Rationale for Devoting Center Resources to IR2.3

Protecting Human Health and Natural Ecosystems

90% of wastewater in developing countries is discharged untreated into open drainage channels, rivers and coastal waters.

1 7 million children die each year from diseases related to poor sanitation

Untreated municipal wastewater in Mexico killed 400,000 migratory birds

Shrimp in Jakarta Bay are contaminated with mercury from untreated industrial wastes

Up to 50% of solid wastes in developing country cities remains uncollected; most cities dispose wastes in open dumps.

In Surat, India, uncollected garbage was linked to an outbreak of the plague

In Negril, Jamaica, leachate from city dump contributed to degradation of coral reefs

IR2.3 Key Countries and Implementation Partners

	IR2.3.1	IR2.3.2	IR2.3.3
Key Countries	HG Programs: India Indonesia Morocco Sri Lanka Tunisia Sustainable Cities: Haiti Jamaica Mexico Morocco	EP3 Programs: Bolivia Chile Ecuador Egypt El Salvador Indonesia Jamaica Mexico Paraguay Peru Tunisia	Comparative Risk Assessments Ecuador India Egypt
Implementation Partners	Urban Programs IQC MDM Contract Env. Engineering IQC	Hagler Bailly EPA RSSA WEF Coop Agreement	Env. Health Proj. EPA

IR2.3 Roadmap for Measuring Progress towards Reduced Urban Pollution

Problem Identification and Public Awareness



Policy and Regulatory Reform



Operation and Maintenance Interventions to Improve Existing Systems



Investments in Pollution Prevention and Mitigation Technologies and Facilities



Establishment of Indigenous and Self-Sustaining Professional/Trade Associations

Problem Identification and Public Awareness Interventions

- Implementation of Participatory Planning Process

Municipal level Comparative Risk Assessments

Bangkok, Quito, Cairo, Ahmedabad, Lima

Community level local environmental action plans

CIMEP - Tunisia

CEAP- Central America

Environmental Mapping - India

- Implementation of Pollution Prevention and Mitigation Assessments, Audits, and Plans

Industrial Pollution Prevention Diagnostic Assessments (PPDA)

Municipal environmental compliance audits

Integrated wastewater/solid waste management plans

Policy and Regulatory Reform Interventions

Progress towards:

- Establishment of effluent guidelines for water quality
- Establishment of guidelines for source reduction, recycling, incineration, and landfills for solid wastes
- Adoption of enabling legislation for public-private partnerships
- Establishment of institutions to advocate for market-based incentives for pollution control programs
- Adoption of enabling legislation for cost recovery of investments in waste management



Operation and Maintenance Interventions to Improve Existing Environmental Management Systems

Progress towards:

- **Adoption of best practices for pollution control and mitigation**

Composting household wastes in Sri Lanka
Waste oil recycling in Botswana

- **Establishment of environmental quality monitoring systems**

Leachate collection system in Tunisia
Monitoring mining pollution in Mexico

- **Investments in more efficient and cost-effective pollution prevention technologies**

Lead-reduction equipment for battery production in Tunisia

Investments in Pollution Prevention and Mitigation Technologies and Facilities

- Preparation of feasibility studies
- Preparation of Environmental Impact Assessments
- Preparation of construction design and contract documents
- Preparation of value engineering studies
- Adoption of best practices in construction management
- Establishment of a process to certify equipment and facility operators

FY96 Accomplishments

IR2.3.1 Municipal Wastewater and Solid Waste

- Published "Anaerobic Enhanced Treatment of Wastewater and Options for Further Treatment"
- Supported workshop/publication: "Municipal Solid Waste to Energy Conversion: Applications for AID-Assisted Countries"
- Supported workshop/publication: "Promotion of Public/Private Partnerships in Municipal Solid Waste Management in Low-Income Countries"
- Developed new Environmental Engineering IQC
- Provided T.A. to Missions/RUDOs - ESAINT India

Key Country Activities

IR2.3.1 Municipal Wastewater and Solid Waste

Country	Activity	Result
Haiti	Water/Sanitation District in Cité Soleil	Construction of communal sanitation facilities
Jamaica	Downtown Kingston Management District	Privatization of collection services
Morocco	Community-based SWM planning in Fez	Improved collection and disposal of neighborhood wastes

Key Country Activities (cont.)

IR2.3.1 Municipal Wastewater and Solid Waste

Country	Activity	Result
Mexico	Sustainable Juarez	Establishment of community recycling centers
Mexico	Sustainable Juarez	Construction of demo wastewater treatment facility
Ecuador	SWM Microenterprise Machala, Quito, Guasmo, Guayaquil	Improved collection services & disposal practices

FY97 Activities

IR2.3.1 Municipal Wastewater and Solid Waste

- Support wastewater/SWM activities under the sustainable cities initiative; collect and disseminate lessons learned.
- Collaborate w/Water Team on preparation of papers for USAID-sponsored session at American Society of Civil Engineers annual conference on water resources planning and management.
- Develop demonstration project for application of the anaerobic enhanced treatment of wastewater.
- Coordinate w/RUDOs on dissemination of "Project Life Cycle" documents prepared under PURSE program.
- Provide backstop support for SWM component of sustainable tourism activity in Egypt